National Aeronautics and Space Administration

Space Photovoltaic Research and Technology Conference

28th Space Photovoltaic Research and Technology Conference

September 4 – 6, 2024

at

NASA Glenn Research Center
Cleveland, OH

AGENDA

28th Space Photovoltaic Research and Technology Conference

Wednesday, September 4, 2024

8:00 – 9:00 Breakfast & Registration

9:00 **Introductory and Welcome Remarks**: Dr. Rickey Shyne, Director of the Research and Engineering Directorate, NASA Glenn Research Center

9:15 Photovoltaics and Power to Support NASA's Moon to Mars Objectives
(NASA Space Technology Mission Directorate / Jeremiah McNatt)

Session I
Silicon Technology Advances

9:35 Annealing of Radiation Damage in Solestial Ultra-Thin Silicon Solar Cells at 65°C at Maximum Power Point and Open Circuit Conditions under Light
(Solestial / Alex Fedoseyev)

9:55 mPower DragonSCALES
(mPower Technology / Murat Okandan)

10:15 Group Photo

10:35 – 10:50 Coffee Break

Session II
Laser Power Beaming

10:50 Laser power beaming spacecrafts lunar constellation
(Volta Space Technologies / Guillaume Blanchette)

11:10 Progress in the Development of Laser Power Beaming Systems for Aerial and Space Applications
(PowerLight Technologies / Drew Cardwell)

11:30 Improving 2J III-V Laser Power Converters at 1064 nm for Lunar Exploration
(Rochester Institute of Technology / Katelynn Fleming)

11:50 Engineering Design Study of Laser Power Beaming for Polar Regions on the Moon
(NASA Glenn Research Center / Geoffrey Landis)

12:10 – 1:20 Lunch

Session III
Mission and Flight Experiments

1:20 Solar Array Performance Modeling for NASA's Artemis Missions
(NASA Glenn Research Center / Spencer Furin)

1:40 Development and On-orbit Operation of Solar Panels for JAXA's Lunar Lander SLIM
(JAXA / Shusaku Kanaya)

2:00 Results of the Caltech SSPP Alba Mission
(California Institute of Technology / Michael Kelzenberg)

Session IV
Solar Array Technology

2:20 Dynovas' Motorless Deployable Array Technologies
(Dynovas / Brynn Hall)

2:40 The Next Chapter for GEO: ROSA's Transformative Technology
(Redwire / Shen Meinhold)

3:00 Isolating the Root Cause of Solar Array Anomalies using PSIM – A SPICE and Python Physics Based Circuit Simulation Tool
(Aerospace Corp. / Colin Mann)

3:20 – 3:40 Break

Session V
III-V Research and Development

3:40 Demonstration of photovoltaics on acoustically spalled surfaces grown by metal organic vapor phase epitaxy
(Rochester Institute of Technology / Seth Hubbard)

4:00 Advanced metallization and processing for high efficiency III-V space solar cells
(National Renewable Energy Laboratory / Myles Steiner)

4:20 Thermoradiative Power Cells for Deep Space and Lunar Applications
(Rochester Institute of Technology / Steve Polly)

5:00 – 8:00 **Picnic** (NASA GRC Picnic Grounds)

Thursday, September 5, 2024

8:00 – 9:00 Breakfast & Registration

Session VI
Mitigating Environmental Impacts

9:00 Electroluminescence Imaging: A Quantitative Characterization Technique to Measure Dust Occlusion of Solar Cells
(NASA Glenn Research Center / Meghan Bush)

9:20 Evaluation of Large Area Ultra-Light Environmental Protection for Space Solar Arrays
(Aerospace Corp. / Pilar Espinet-Gonzalez)

9:40 UV Stress Testing of Perovskite Devices Packaged with Different UV-blocking Materials
(Swift Solar / Nancy Trejo)

10:00 – 10:15 Break

Session VII
Space-based Solar Power

10:15 Space Based Solar Power – Enabling Lunar Night Survival and Beyond
(NASA Marshall Space Flight Center / Christopher McKinney)

10:35 Advanced Solar cells with Thermal, Radiation, And Light management (ASTRAL) for Space Based Solar Power
(University of Cambridge / Louise Hirst)

Session VIII
Advanced Characterization

10:55 Mapping Spectroscopic Ellipsometry of CdS/CdSe/CdTe Photovoltaics
(University of Toledo / Mohammed A. Alaani)

11:15 Comparison of Illuminated IV and Dark IV Solar Panel Testing: The Blind Spots of Dark IV
(Angstrom Designs / Casey Hare)

11:35 Solar Cell IV Testing on the Lunar Surface
(Angstrom Designs / Scott Ireton)

11:55 UNT ion irradiation facilities
(University of North Texas / Bibhudutta Rout)

12:15 – 1:20 Lunch

Session IX
Metal Halide Perovskites

1:20 Enhancing durability and performance in photovoltaic cells through guanidinium-based quasi-2D halide perovskites
(Oklahoma State University / Matthew Bamidele)

1:40 Radiation Tolerance of Metal-Halide Perovskites: Fact or Fiction?
(Rochester Institute of Technology / Ahmad Kirmani)

2:00 Metal Halide Perovskite Solar Panels for Space Applications
(National Renewable Energy Laboratory / Joey Luther)

2:20 Thermal Performance of Perovskite-Based Photovoltaics for Operation in Low Earth Orbit
(NASA Glenn Research Center / Lyndsey McMillon-Brown)

2:40 Metal Halide Perovskite Solar Cells for Emerging Space Applications
(SUNY Buffalo / Ian Sellers)

3:00 – 3:15 Break

3:15 – 4:15 Poster Session

Alisha Adhikari	University of Toledo	Proton Radiation Hardness of Antimony Chalcogenide Solar Cells
Manoj K. Jamarkattel	University of Toledo	High Efficiency, Light weight, and Flexible CdTe Based Solar Cells
Alex Jurcago	John Carroll University	Analysis of Glint During the Artemis I Mission
Tal Kasher	The Ohio State University	Trap Analysis of Zn- vs. C-doped 2.1eV AlGaInP irradiated by 3MeV Protons
Megh Khanal	University at Buffalo, SUNY	Encapsulation Study of Metal Halide Perovskites for Space Applications
Scott Lambright	University of Toledo	Effects of Proton Bombardment on Sunnyside Device Performance of Industry-Grade Bifacial CdTe:Cu- and CdTe:As-Based Solar Cells

Madan Mainali	University of Toledo	Wide spectral range optical characterization and electronic transport property determination using spectroscopic ellipsometry
Anthony Mazur	Rochester Institute of Technology	Optimization of InGaAs quantum wells for two-Junction Solar Cells
Aesha Patel	University of Toledo	Identifying Suitable Front Contacts for Cd(Se, Te) Solar Cells on Space-Qualified Cover Glass
Crystal Qu	Rochester Institute of Technology	Photoluminescence Mapping as an Indicator of External Radiative Efficiency in Quantum Wells
Elijah Sacchitella	Rochester Institute of Technology	GaAs Substrate Reuse using Acoustic Spalling
Rivka Stasavage	Rochester Institute of Technology	Development of External Radiative Efficiency Technique as a Predictor of Material Quality for InGaP

6:00 – 8:30 Banquet

Friday, September 6, 2024

8:00 – 9:00 Breakfast & Registration

Session XI
III-V Solar Cells and Arrays

9:00 The 4G32-Advanced four-junction solar cell adapted to spectral conditions on Mars
(AZUR SPACE / Felix Gerstenberger)

9:20 Technology and Manufacturing Advancements to Address Increasing Space Solar Power Demands
(Spectrolab / Daniel Law)

9:40 Advancements in SolAero's III-V solar cells for space
(SolAero by Rocket Lab / Nate Miller)

10:00 Flexible and lightweight solar power modules for LEO satellites and next-generation arrays
(Microlink Devices / Chris Youtsey)

10:20 – 10:35 Break

Session XII

Tandem Photovoltaics

10:35 Dimensionally Modified Halide Perovskites and Chalcogenides for Thin-Film Tandem Solar Cells
(Purdue University / Shubhra Bansal)

11:55 Advancements in Thin-Film Solar Cells for Space Applications
(Colorado State University / Amit Munshi)

11:15 Perovskite Tandem Solar Cells for Space Power Applications
(University of Toledo / Zhaoning Song)

11:35 Modeling Candidate Metal Halide Perovskites for Highly Efficient Tandem Solar Cells
(NASA Ames Research Center / Zhigang Wu)

11:55 Closing Statements

12:00 Conference Ends